



Review

A systematic review of the pain scales in adults: Which to use?

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ABSTRACT

Objective: The study analysed the Visual Analogue Scale (VAS), the Verbal Rating Scale (VRS) and the Numerical Rating Scale (NRS) to determine: 1. Were the compliance and usability different among scales? 2. Were any of the scales superior over the other(s) for clinical use?

Methods: A systematic review of currently published studies was performed following standard guidelines. Online database searches were performed for clinical trials published before November 2017, on the comparison of the pain scores in adults and preferences of the specific patient groups. A literature search via electronic databases was carried out for the last fifteen years on English Language papers. The search terms initially included pain rating scales, pain measurement, pain intensity, VAS, VRS, and NRS. Papers were examined for methodological soundness before being included. Data were independently extracted by two blinded reviewers. Studies were also assessed for bias using the Cochrane criteria.

Results: The initial data search yielded 872 potentially relevant studies; of these, 853 were excluded for some reason. The main reason for exclusion (33.7%) was that irrelevance to comparison of pain scales and scores, followed by pediatric studies (32.1%). Finally, 19 underwent full-text review, and were analysed for the study purposes. Studies were of moderate ($n = 12$, 63%) to low ($n = 7$, 37%) quality.

Conclusions: All three scales are valid, reliable and appropriate for use in clinical practice, although the VAS is more difficulties than the others. For general purposes the NRS has good sensitivity and generates data that can be analysed for audit purposes.

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1. Pain in the emergency department

Acute pain is one of the most common chief complaints reported by most patients admitted to the ED, while its perception and expression have great variations between countries [1]. The definition of pain by International Association for the Study of Pain (IASP) as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’ is accepted worldwide [2].

Subjective and multidimensional nature of the pain experience render pain assessment really challenging. In the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) guidelines, implementation of this standard in clinical practice comprised the addition of pain as the “fifth” vital sign to be noted in the context of initial assessment; the use of pain intensity ratings; and posting of a statement on pain management in all patient care areas. Supplemented with regular pain reassessments, the schedule of pain reassessment should be driven by patients’ pain severity [3].

Pain estimations need to be elicited and recorded to highlight both the presence of pain and the efficacy of pain treatment. The patients’ perception of pain should be documented during the initial assessment of a patient. Current evidence provides a general recommendation that pain needs to be evaluated and managed within 20–25 min of initial healthcare provider assessment in the ED [4]. Pain treatment should be targeted to a goal of reducing the pain score (e.g., by 50%, below 4/10, or referred to as mild/moderate or severe) rather than a specific analgesic dose [5].

2. Pain scores and documentation of pain

The patient’s self-report is the most accurate and reliable evidence of the existence of pain and its intensity, and this holds true for patients of all ages, regardless of communication or cognitive deficits [6].

In the absence of objective measures, the clinician must depend on the patient to supply key information on the localization, quality and severity of the pain. Although physicians commonly question the reported severity and rely on their own estimates, the value of the patients’ description of the location and nature of the discomfort has been proved on the theoretical basis and routine practice [7].

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Pain scores have gained acceptance as the most accurate and reliable measure of assessing a patient's pain and response to pain treatment [5]. Scales devised to estimate and/or express the patient's pain can be evaluated in two groups: Unidimensional and multidimensional measures. It should be noted that unidimensional scales measure only intensity, they cannot be viewed as a comprehensive pain assessment. Comprehensive pain assessment is expected to encompass both the unidimensional measurement of pain intensity and the multidimensional evaluation of the pain perception. The unidimensional pain intensity scales commonly used bedside are:

- Numeric Rating Scale (NRS),
- Visual Analog Scale (VAS),
- Verbal Rating/Descriptor Scale (VRS/VDS).

2.1. B.1

The VAS is the most widely used tool for estimating both severities of pain and to judge the extent of pain relief [8]. Healthcare worker asks the patient to select a point on a line drawn between two ends to express how intense he/she perceives pain (Fig. 1). The VAS is a continuous scale comprised of a horizontal (HVAS) or vertical (VVAS) line, usually 100 mm long, anchored by two verbal descriptors (i.e., “no pain” and “worst imaginable pain”) [9, 10]. Patients are asked to rate “current” pain intensity or pain intensity “in the last 24 h”.

The VAS is an easy-to-use instrument which does not warrant using a sophisticated device. It is also highly sensitive in detecting treatment effects, and its results can be analysed by parametric tests [11]. Minimal translation difficulties have led to an unknown number of cross-cultural adaptations [10]. Although this tool is suitable for use with older children and adults, the need for a marking and for being able to visualize and mark the line, can make the VAS impractical to use in the emergency situation. On the other hand, most experts believe that the VAS offers little practical advantage over verbal reports in the clinical practice [5].

2.2. B.2

The numeric rating scale (NRS) is a single 11-point numeric scale broadly validated across myriad patient types. Data obtained via NRS are easily documented, intuitively interpretable, and meet regulatory requirements for pain assessment and documentation [12]. To date, findings demonstrated that even in the chaotic prehospital phase most acute care patients allow evaluation via a simple “zero-to-10 scale” or NRS reliably, respecting their pain levels [13]. Like the pain VAS, minimal language translation difficulties support the use of the NRS across cultures and languages [14].

Evidence indicated that patients really want to give a pain number, rather than simply relate whether they want analgesia. Strengths of this measure over the pain VAS are the ability to be administered both verbally (therefore by telephone) and in writing, as well as its simplicity of scoring. However, similar to the pain VAS, the pain NRS evaluates only 1 component of the pain experience, pain intensity, and therefore does not capture the complexity and idiosyncratic nature of the pain experience or improvements due to symptom fluctuations [10].

NRS is a commonly used tool necessitating the patient rate his pain on a scale from 0 to 10, with 0 indicating no pain and 10 reflecting the worst possible pain (Fig. 2). NRS are often conducted as a scale from 1 to 10 which does not give the patient a solution to indicate no pain at all. It can be used with children who are able to understand numbers. The pain scores are interpreted as:

- 0 = no pain
- 1–3 = mild pain

- 4–6 = moderate pain
- 7–10 = severe pain

NRS can be used with most children older than 8 years of age, and behavioral observation scales are required for those unable to provide a self-report [15]. For patients with cancer-related pain, the NRS is the most frequently used instrument to measure pain intensity [16]. Goulet et al. examined the agreement and correlation of electronic medical record-based ratings of NRS and self-administered NRS in 1643 adult patients [17]. The correlation was high, but the mean electronic medical record-based NRS score was significantly lower than the survey score (1.72 vs. 2.79; $p < 0.0001$).

2.3. B.3

Verbal Pain Scores (VPSs), Verbal Rating Scales (VRS) or Verbal Descriptor Scales: These tools may discern those patients who are truly in pain but who may not express their discomfort, as well as influence the physician to inquire about the patient's pain.

VRS consist of a number of statements describing increasing pain intensities (Fig. 1). Patients are told to choose the word which best describes their pain intensity. The number of descriptors used has ranged from four (none, mild, moderate, severe) to 15 [18]. For patients who have limited literacy or cognitive impairment, use of these scales may be difficult, and they do not provide the number of choices available with the VAS or NRS, thus potentially limiting precision [19].

This article reviews the current literature to provide systematic data regarding the results from comparative studies on unidimensional assessment of pain intensity using the NRS, VRS, or VAS. The following points were investigated to determine evidence-based recommendations:

- Were the compliance and usability different among scales?
- Were any of the scales superior over the other(s) for clinical use?

3. Methods

A systematic review of currently published studies was performed following standard guidelines. Online database searches were performed for randomized controlled trials published before November 2017, on the comparison of the pain scores in adults and preferences of the specific patient groups. A literature search via the Cochrane Central Register of Controlled Trials, PubMed/Medline, Clinical Key, EMBASE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and BIOSIS was carried out for the last fifteen years on English Language papers. Published studies evaluating the patients' preferences and usability of the pain intensity scales were targeted. The reference lists of retrieved articles were used to generate more papers and search terms. Data were independently extracted by two blinded reviewers. The discrepancies, on the other hand, were resolved by the primary author. The research protocol to answer these questions was registered in PROSPERO, the International Prospective Register of Systematic Reviews (registration number is: CRD42017080974).

3.1. Search methodology

A comprehensive literature search was carried out using the following strategy:

Online searches were performed using the following search keywords and terms: ('pain assessment' OR 'pain intensity' OR 'pain score' OR 'pain comparison' OR 'pain scale' OR 'acute pain' OR 'pain rating') AND ('emergency' AND 'acute' AND 'score'). The search was limited to human studies (clinical trials) conducted on adults and published in English.

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